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## CLAIMS

### (57) [Claim(s)]

[Claim 1] In the slide rail which shows around or becomes it tense about the chain for the camshaft-drive equipment of an internal combustion engine It has the slide lining object (5; 49; 60) connected with a base material (4; 50; 59) and this base material. When a base material consists of synthetic resin of high intensity, a slide lining object consists of wear-resistant synthetic resin and a base material and a slide lining object carry out injection molding of another side, using one of these which was fabricated as metal mold The slide rail characterized by really being connected indivisible so that it may catch each other.

[Claim 2] The slide rail according to claim 1 characterized by a joint being a dovetail groove joint (9, 10, 67).

[Claim 3] The slide rail according to claim 1 or 2 characterized by forming two dovetail groove joints (9 10) prolonged in the chain run direction (B-B) between a slide lining object (5 49) and a base material (4 50).

[Claim 4] The slide rail according to claim 2 or 3 which it has at least one edge field (17 or 18) at which the base material (4 50) turned to the chain run direction (B-B), and the bend (19 20) of a slide lining object (5) is turning around the surroundings of this edge field, and is characterized by forming the dovetail groove joint (9 10) between a slide object and an edge field (17 or 18).

[Claim 5] The slide rail according to claim 1 which a base material (4 50) sees on the cross section, is equipped with two or more isolated longitudinal direction flanges (53 21, 22; 52, 54), and is characterized by having prolonged the web (23 55) in between this longitudinal direction flange.

[Claim 6] The slide rail according to claim 5 characterized by preparing the web (23 55) in the main straight side flat surface (D-D) of a slide rail (1 45).

[Claim 7] The slide rail according to claim 5 or 6 which a longitudinal direction rib (24 25) is prepared in the side of a web (23 55), and is characterized by having prolonged this longitudinal direction rib between longitudinal direction flanges (21 22).

[Claim 8] The slide rail according to claim 5 characterized by installing other longitudinal direction flanges (54) between longitudinal direction flanges (52 53).

[Claim 9] The slide rail of any one publication of the claim 5 and claim 6 to which a longitudinal direction flange (21 22) is locally characterized by being supported to a web (23) with a paragraph element (26 27), and the claim 8.

[Claim 10] The slide rail according to claim 1 or 2 which a slide lining object (60) is laid underground in a base material (59), and is characterized by having prolonged the dovetail groove joint (67) in the longitudinal direction to a chain longitudinal direction between a base material (59) and a slide lining object (60) including the path which encloses a chain from a plurality side.

[Claim 11] The slide rail according to claim 10 characterized by forming the dovetail groove joint (67) in the leg (68 69) which a slide lining object (60) and a base material (59) counter.

[Claim 12] The slide rail according to claim 10 or 11 characterized by having prolonged the dovetail groove joint (67) over a part of leg (68 69) of a slide lining object (60).

[Claim 13] The slide rail of any one publication from a claim 1 to a claim 12 which a bearing eye (30 31) is prepared in a base material (4), and is characterized by having the locking device (36) with which this bearing eye engages with the crevice (40) of the bearing pin (29) of an internal combustion engine.

[Claim 14] each locking device (36) acts on radial [ of each bearing pin (29) ] elastically -- the elastic slide rail according to claim 13 which binds tight and is characterized by this thing [ that bind tight and the element is made by a base material (4) and one ] including an element (41 42)

[Claim 15] The slide rail according to claim 13 which a locking device (36) \*\*\*\*s, it is a pin (38), and this screw-thread pin acts on a bearing pin (29) radial, and is characterized by the amount of [ of a screw-thread pin ] (39) bulb engaging with the crevice (40) of a bearing pin.

[Claim 16] The slide rail according to claim 3 characterized by having seen on the cross section of a slide rail (1 42), the forming section (11 12) in which it catches the 1st dovetail groove guide (9) for each other having adjoined the main straight side flat surface (D-D), and having been prolonged, and for the forming section (13 14) in which it catches the 2nd dovetail groove joint (10) for each other having adjoined the marginal field (15 16),

and having prolonged it.

[Claim 17] The slide rail according to claim 3 characterized by seeing on the cross section of a slide rail (1 45), and for a dovetail groove joint (13 11, 12, and 14) shifting a position mutually, and forming it.

[Claim 18] The slide rail according to claim 10 or 11 characterized by distributing a dovetail groove joint (67) to homogeneity mostly, and arranging it covering the overall length of a slide rail (56).

[Claim 19] The slide lining object connected with the base material is made by wear-resistant synthetic resin. A base material is made from the synthetic resin of high intensity. a base material and a slide lining object Or it sets to the method for manufacturing the slide rail for making it become it tense. the chain mutual really combined indivisible through one piece or two or more joints which are engaged so that it may catch each other -- guidance -- and -- The manufacture method of the slide rail characterized by uniting with a base material (4) by the injection-molding method similarly in order that a base material (4) may be first made by the injection-molding method and a slide lining object (5) may form the whole slide rail (1) after that.

[Claim 20] The slide lining object connected with the base material is made by wear-resistant synthetic resin. A base material is made from the synthetic resin of high intensity. a base material and a slide lining object It is mutual really combined indivisible through one piece or two or more joints which are engaged so that it may catch each other. Furthermore, a slide lining object is laid underground in a base material including the path which encloses a chain from a plurality side. Or it sets to the method for manufacturing the slide rail for making it become it tense. the chain with which the dovetail groove joint is prolonged in the longitudinal direction to the chain longitudinal direction between the base material and the slide lining object -- guidance -- and -- The manufacture method of the slide rail which a part for the lining soma which forms a slide lining object (64 65) is first made by the injection-molding method, and is characterized by uniting with the portion which forms a base material (59) by the injection-molding method similarly after that.

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## DETAILED DESCRIPTION

### [Detailed Description of the Invention]

#### [Industrial Application]

this invention is formed with the base material and the slide lining object made of synthetic resin connected with this base material -- especially -- the chain for the camshaft-drive equipment of an internal combustion engine -- guidance -- and -- or it is related with the slide rail for making it become it tense

#### [Description of the Prior Art]

the [ French country patent ] -- the chain slide rail made of synthetic resin of T typeface is indicated for the cross section by 1 408 No. 575 official report

the [ West German country patent application public presentation ] -- the tension rail for chain gears is known from 30 49 No. 106 official report This tension rail includes the base material made from sheet metal, and the slide lining object made of synthetic resin which encloses this base material. A base material and slide lining objects are the parts each other made separately, and collaborate through stop equipment.

the [ West German country patent ] -- 34 17 No. 100 official report shows the slide rail equipped with casing with a path of the hollow which encloses a chain from a four way type This slide rail also consists of synthetic resin.

#### [Problem(s) to be Solved by the Invention]

the chain which can be alike and lightweight as for the technical problem of this invention, and can bear big stress, and can be manufactured by the low cost -- guidance -- and -- or it is offering the slide rail for becoming it tense

#### [The means for solving a technical problem]

when have the slide lining object connected with a base material and this base material according to this invention, a base material consists of synthetic resin of high intensity, a slide lining object consists of wear-resistant synthetic resin and a base material and a slide lining object carry out injection molding of another side, using one of these which was fabricated as metal mold, this technical problem is really connected indivisible so that it may catch each other -- \*\*\*\* -- therefore, it is solved Other features of this invention are indicated to a claim 2 or 20.

#### [Effect of the Invention]

The slide rail of a claim 1 which consists of a combined base material and a slide lining object can be manufactured easily lightweight. Furthermore, it can bear permanently to the load produced with a chain.

The dovetail groove joint according to claim 2 is very effective as a joint.

The dovetail groove joint according to claim 3 by which profit arrangement was carried out combines a base material and a slide lining object good.

A bend according to claim 4 optimizes combination with a base material and a slide lining object.

A slide rail serves as a body of high intensity according to the feature of claims 5, 6, and 7 and eight publications.

The slide rail according to claim 10 to 12 which consists of a base material and a slide lining object is usable in the place for which path-like guidance [ chain ] is needed.

A very effective locking device is offered according to the feature of claims 13 and 14 and 15 publications.

By claims 16 and 17 and the dovetail groove joint of 18 publications, a slide rail can bear big stress and a base material and a slide lining object are combined very certainly.

The method of a claim 19 and 20 publications is suitable for a slide rail, and enables manufacture of a low cost. In this case, post processing is unnecessary.

#### [Example]

The example of this invention is shown in drawing. Hereafter, this example is explained in detail.

The slide rail 1 for guiding a chain 2 is shown in the view 1. This chain is the endless member of for example, a chain gear. Chain gears may be the parts of the internal combustion engine which is not illustrated, and act between a crankshaft and a control axis (it is also called a cam shaft) in this case.

The slide rail 1 is formed with the base material 4 and the slide lining object 5. A chain 2 is guided in accordance

with this slide lining object 5.

The base material 4 and the slide lining object 5 consist of synthetic resin of different specification, especially a polyamide. In this case, the polyamide which added the glass fiber is used for a base material 4, and the wear-resistant polyamide which does not add a glass fiber is used for the slide lining object 5.

The slide lining object 5 has the sliding surface 6 for a chain 2. This sliding surface is formed by shoulders 7 and 8 so that it may have a U character-like profile.

The base material 4 and the slide lining object 5 are assembled within flat-surface A-A. Between this part that forms a unit, the mechanism engaged so that it may fit in mutually, it may hang mutually, namely, it may catch each other is established. This mechanism is formed by two dovetail groove joints 9 and 10 in the example shown in a view 2. This dovetail groove joint is prolonged in chain run direction B-B (refer to the 1st view ).

The dovetail groove joints 9 and 10 were seen on the cross section, and shifted the position, namely, each other were formed in the interval C, and are equipped with the forming sections 11 and 12 to hang, and 13 and 14. The forming sections 11 and 12 of 9 of a dovetail groove joint are formed next to main straight side flat-surface D-D of the slide rail 1. The forming sections 13 and 14 of the dovetail groove joint 10 are formed next to the marginal fields 15 and 16 of the slide rail 1.

A base material 4 has the edge fields 17 and 18 (refer to the 1st view ) at which it has turned to chain run direction B-B. The bends 19 and 20 of the slide lining object 5 are turning around the surroundings of the aforementioned edge fields 17 and 18. The dovetail groove joint shown in the view 2 is formed also between these edge fields 17 and 18 and bends 19 and 20.

The base material 4 was seen on the cross section ( view 2), and is equipped with the longitudinal direction flanges 21 and 22 which set the interval and were prepared. This longitudinal direction flange was connected with the web 23, and this web is prolonged along with main straight side flat-surface D-D of the slide rail 1. According to this structure, the base material 4 serves as a double T typeface.

Two or more longitudinal direction ribs 24 and 25 which set the interval mutually and were prepared are formed in the side of a web 23. This longitudinal direction rib is prolonged in between the longitudinal direction flanges 21 and 22, and reaches perpendicularly to chain run direction B-B, or is arranged aslant. Furthermore, the longitudinal direction flanges 21 and 22 can be supported to a web 23 with the paragraph elements 26 and 27. The element is similarly prolonged in the longitudinal direction to the chain run direction at present.

Maintenance of the slide rail 1 is performed by the bearing pins 28 and 29 of an internal combustion engine. This bearing pin has held the bearing eyes 30 and 31. The metal bush 33 is inserted in the bearing eye 30 (refer to the 3rd view ). This metal bush is held with the flange 34 at the base material 4. The bearing eye 31 is equipped with a kind of slit 35. Therefore, the thermal expansion of the slide rail 1, especially the thermal expansion between bearing PIN 28 and 29 are compensated.

The locking device 36 is formed between the slide rail 1 and the bearing pin 29 (refer to the 4th view ). This locking device is formed by the metal screw-thread bush 37 and the screw-thread pin 38 with which it is equipped into it. As for a screw-thread pin, the amount of [ 39 ] bulb engages with the crevice 40 of the shape of a slot of the bearing pin 29, and the slide rail 1 is held by it at shaft orientations.

a locking device 36 is elastic in a view 5 and a view 6 -- it binds tight and is formed with elements 41 and 42 this -- it binds tight and the element is made by a base material 4 and one It binds tight and, as for elements 41 and 42, the salients 43 and 44 are inserted in the crevice 38 of the bearing pin 29.

The slide rail 1 is manufactured as follows. First, it is made with the dovetail groove fabrication section to which a base material 4 is made by injection molding, and moreover belongs to it and which met Line E (refer to the 2nd view ), and is \*\*\*. Then, a base material 4 is used as a base and the slide lining object 5 is united with the aforementioned base material 4 by injection molding.

The slide rail 45 for stretching a chain 46 is shown in the view 7 and the octavus view . Therefore, the slide rail is stretched by by the way being supported by the rockable by the equipment which acts in the direction of F of 47 which is not illustrated. The chain run side 48 of the slide lining object 49 is prolonged in the segment. On the other hand, the chain run side 48 and the field 51 of the base material 50 of an opposite side are prolonged like a secant. The base material 50 is equipped with other longitudinal direction flanges 54 among the adjoining longitudinal direction flanges 52 and 53. The longitudinal direction flange is altogether connected with the web 55 prolonged along with main straight side flat-surface D-D. In this example, the longitudinal direction flanges 53 and 54 are seen on the cross section, and width of face is large rather than the slide lining object 49. Thereby, the intensity of the slide rail 45 increases further. The point of others of the SURRA id rail 45 is the same as the structure of the slide rail 1.

The slide rail 56 is equipped with the path 58 which encloses a chain 57 from a four way type in the view 9 and the view 10. In this case, the base material 59 and the slide lining object 60 consist of a hold portion 61 and a synizesis portion 62. Both this portion is combined in longitudinal center flat-surface G-G, and is being fixed with the bolt prepared in the place of 63. In this case, the hold portion 61 was equipped with a part for the 1st lining soma 64 of U typeface which encloses a chain 57 from a three way type, and the synizesis portion 62 is

equipped with a part for the 2nd lining soma 65. A part for the 2nd [ this ] lining soma is held by the shoulder 66 in the synizesis portion 62.

Between the 1st part for the lining soma 64 and hold portion 61, two or more dovetail groove joints 67 are formed (refer to the 9th view ). Covering the overall length of the slide rail 56, this dovetail groove joint was mostly distributed to homogeneity, and has been arranged, and is prolonged in the longitudinal direction to the chain longitudinal direction. The dovetail groove joint 67 is formed in the biped sections 68 and 69 for the lining soma 64 in that case. Furthermore, the dovetail groove joint 67 is shorter than the leg 68. That is, the dovetail groove joint 67 is prolonged [ for a part of lining 64 soma ]. Therefore, in the chain longitudinal direction, fixed maintenance of the part for a lining soma is carried out by the shoulder 70.

In the case of this slide rail, parts for the lining soma 64 and 65 of the slide lining object 60 are first made from a separate cycle by injection molding. Then, the hold portion 61 and the synizesis portion 62 of a base material 59 are united with parts for the lining soma 64 and 65 by injection molding.

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TECHNICAL FIELD

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[Industrial Application]

this invention is formed with the base material and the slide lining object made of synthetic resin connected with this base material -- especially -- the chain for the camshaft-drive equipment of an internal combustion engine -- guidance -- and -- or it is related with the slide rail for making it become it tense

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PRIOR ART

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[Description of the Prior Art]

the [ French country patent ] -- the chain slide rail made of synthetic resin of T typeface is indicated for the cross section by 1 408 No. 575 official report

the [ West German country patent application public presentation ] -- the tension rail for chain gears is known from 30 49 No. 106 official report. This tension rail includes the base material made from sheet metal, and the slide lining object made of synthetic resin which encloses this base material. A base material and slide lining objects are the parts each other made separately, and collaborate through stop equipment.

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## EFFECT OF THE INVENTION

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### [Effect of the Invention]

The slide rail of a claim 1 which consists of a combined base material and a slide lining object can be manufactured easily lightweight. Furthermore, it can bear permanently to the load produced with a chain. The dovetail groove joint according to claim 2 is very effective as a joint.

The dovetail groove joint according to claim 3 by which profit arrangement was carried out combines a base material and a slide lining object good.

A bend according to claim 4 optimizes combination with a base material and a slide lining object.

A slide rail serves as a body of high intensity according to the feature of claims 5, 6, and 7 and eight publications.

The slide rail according to claim 10 to 12 which consists of a base material and a slide lining object is usable in the place for which path-like guidance [chain] is needed.

A very effective locking device is offered according to the feature of claims 13 and 14 and 15 publications.

By claims 16 and 17 and the dovetail groove joint of 18 publications, a slide rail can bear big stress and a base material and a slide lining object are combined very certainly.

The method of a claim 19 and 20 publications is suitable for a slide rail, and enables manufacture of a low cost. In this case, post processing is unnecessary.

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TECHNICAL PROBLEM

---

[Problem(s) to be Solved by the Invention]

the chain which can be alike and lightweight as for the technical problem of this invention, and can bear big stress, and can be manufactured by the low cost -- guidance -- and -- or it is offering the slide rail for becoming it tense

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MEANS

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[The means for solving a technical problem]

when have the slide lining object connected with a base material and this base material according to this invention, a base material consists of synthetic resin of high intensity, a slide lining object consists of wear-resistant synthetic resin and a base material and a slide lining object carry out injection molding of another side, using one of these which was fabricated as metal mold, this technical problem is really connected indivisible so that it may catch each other -- \*\*\*\* -- therefore, it is solved Other features of this invention are indicated to a claim 2 or 20.

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## EXAMPLE

### [Example]

The example of this invention is shown in drawing. Hereafter, this example is explained in detail. The slide rail 1 for guiding a chain 2 is shown in the view 1. This chain is the endless member of for example, a chain gear. Chain gears may be the parts of the internal combustion engine which is not illustrated, and act between a crankshaft and a control axis (it is also called a cam shaft) in this case.

The slide rail 1 is formed with the base material 4 and the slide lining object 5. A chain 2 is guided in accordance with this slide lining object 5.

The base material 4 and the slide lining object 5 consist of synthetic resin of different specification, especially a polyamide. In this case, the polyamide which added the glass fiber is used for a base material 4, and the wear-resistant polyamide which does not add a glass fiber is used for the slide lining object 5.

The slide lining object 5 has the sliding surface 6 for a chain 2. This sliding surface is formed by shoulders 7 and 8 so that it may have a U character-like profile.

The base material 4 and the slide lining object 5 are assembled within flat-surface A-A. Between this part that forms a unit, the mechanism engaged so that it may fit in mutually, it may hang mutually, namely, it may catch each other is established. This mechanism is formed by two dovetail groove joints 9 and 10 in the example shown in a view 2. This dovetail groove joint is prolonged in chain run direction B-B (refer to the 1st view ).

The dovetail groove joints 9 and 10 were seen on the cross section, and shifted the position, namely, each other were formed in the interval C, and are equipped with the forming sections 11 and 12 to hang, and 13 and 14. The forming sections 11 and 12 of 9 of a dovetail groove joint are formed next to main straight side flat-surface D-D of the slide rail 1. The forming sections 13 and 14 of the dovetail groove joint 10 are formed next to the marginal fields 15 and 16 of the slide rail 1.

A base material 4 has the edge fields 17 and 18 (refer to the 1st view ) at which it has turned to chain run direction B-B. The bends 19 and 20 of the slide lining object 5 are turning around the surroundings of the aforementioned edge fields 17 and 18. The dovetail groove joint shown in the view 2 is formed also between these edge fields 17 and 18 and bends 19 and 20.

The base material 4 was seen on the cross section ( view 2 ), and is equipped with the longitudinal direction flanges 21 and 22 which set the interval and were prepared. This longitudinal direction flange was connected with the web 23, and this web is prolonged along with main straight side flat-surface D-D of the slide rail 1. According to this structure, the base material 4 serves as a double T typeface.

Two or more longitudinal direction ribs 24 and 25 which set the interval mutually and were prepared are formed in the side of a web 23. This longitudinal direction rib is prolonged in between the longitudinal direction flanges 21 and 22, and reaches perpendicularly to chain run direction B-B, or is arranged aslant. Furthermore, the longitudinal direction flanges 21 and 22 can be supported to a web 23 with the paragraph elements 26 and 27.

The element is similarly prolonged in the longitudinal direction to the chain run direction at present.

Maintenance of the slide rail 1 is performed by the bearing pins 28 and 29 of an internal combustion engine. This bearing pin has held the bearing eyes 30 and 31. The metal bush 33 is inserted in the bearing eye 30 (refer to the 3rd view ). This metal bush is held with the flange 34 at the base material 4. The bearing eye 31 is equipped with a kind of slit 35. Therefore, the thermal expansion of the slide rail 1, especially the thermal expansion between bearing PIN 28 and 29 are compensated.

The locking device 36 is formed between the slide rail 1 and the bearing pin 29 (refer to the 4th view ). This locking device is formed by the metal screw-thread bush 37 and the screw-thread pin 38 with which it is equipped into it. As for a screw-thread pin, the amount of [ 39 ] bulb engages with the crevice 40 of the shape of a slot of the bearing pin 29, and the slide rail 1 is held by it at shaft orientations.

a locking device 36 is elastic in a view 5 and a view 6 -- it binds tight and is formed with elements 41 and 42 this -- it binds tight and the element is made by a base material 4 and one It binds tight and, as for elements 41 and 42, the salients 43 and 44 are inserted in the crevice 38 of the bearing pin 29.

The slide rail 1 is manufactured as follows. First, it is made with the dovetail groove fabrication section to which a base material 4 is made by injection molding, and moreover belongs to it and which met Line E (refer to the

2nd view ), and is \*\*\*\*. Then, a base material 4 is used as a base and the slide lining object 5 is united with the aforementioned base material 4 by injection molding.

The slide rail 45 for stretching a chain 46 is shown in the view 7 and the octavus view. Therefore, the slide rail is stretched by by the way being supported by the rockable by the equipment which acts in the direction of F of 47 which is not illustrated. The chain run side 48 of the slide lining object 49 is prolonged in the segment. On the other hand, the chain run side 48 and the field 51 of the base material 50 of an opposite side are prolonged like a secant. The base material 50 is equipped with other longitudinal direction flanges 54 among the adjoining longitudinal direction flanges 52 and 53. The longitudinal direction flange is altogether connected with the web 55 prolonged along with main straight side flat-surface D-D. In this example, the longitudinal direction flanges 53 and 54 are seen on the cross section, and width of face is large rather than the slide lining object 49. Thereby, the intensity of the slide rail 45 increases further. The point of others of the SURRA id rail 45 is the same as the structure of the slide rail 1.

The slide rail 56 is equipped with the path 58 which encloses a chain 57 from a four way type in the view 9 and the view 10. In this case, the base material 59 and the slide lining object 60 consist of a hold portion 61 and a synizesis portion 62. Both this portion is combined in longitudinal center flat-surface G-G, and is being fixed with the bolt prepared in the place of 63. In this case, the hold portion 61 was equipped with a part for the 1st lining soma 64 of U typeface which encloses a chain 57 from a three way type, and the synizesis portion 62 is equipped with a part for the 2nd lining soma 65. A part for the 2nd [ this ] lining soma is held by the shoulder 66 in the synizesis portion 62.

Between the 1st part for the lining soma 64 and hold portion 61, two or more dovetail groove joints 67 are formed (refer to the 9th view). Covering the overall length of the slide rail 56, this dovetail groove joint was mostly distributed to homogeneity, and has been arranged, and is prolonged in the longitudinal direction to the chain longitudinal direction. The dovetail groove joint 67 is formed in the biped sections 68 and 69 for the lining soma 64 in that case. Furthermore, the dovetail groove joint 67 is shorter than the leg 68. That is, the dovetail groove joint 67 is prolonged [ for a part of lining 64 soma ]. Therefore, in the chain longitudinal direction, fixed maintenance of the part for a lining soma is carried out by the shoulder 70.

In the case of this slide rail, parts for the lining soma 64 and 65 of the slide lining object 60 are first made from a separate cycle by injection molding. Then, the hold portion 61 and the synizesis portion 62 of a base material 59 are united with parts for the lining soma 64 and 65 by injection molding.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

The expanded sectional view to which the view 1 met the side elevation of a slide rail, and the view 2 met the II-II line of a view 1, The expanded sectional view to which the view 3 met the III-III line of a view 1, and a view 4 The enlarged view of X portion of a view 1, The drawing as the view 4 of other examples where a view 5 is the same, the cross section with which the view 6 met the VI-VI line of a view 5, The drawing as the view 1 of other examples where the expanded sectional view to which the drawing as the view 1 of other examples where a view 7 is the same, and the octavus view met the VII-VII line of a view 7 and a view 9 are the same, and a view 10 are expanded sectional views which met the X-X line of a view 9.

4, 50, 59, 55 [ .. Hanging / fitting-cum-/ mechanism, ] .... A base material, 5, 49, 60 .. A slide lining object, 9, 10, 67

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[Translation done.]

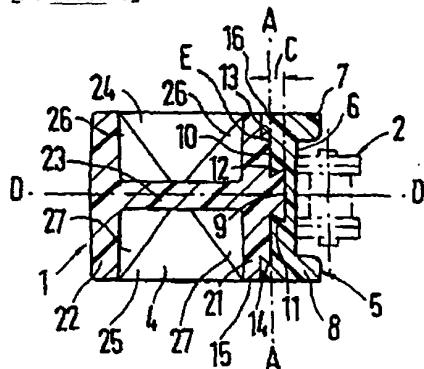
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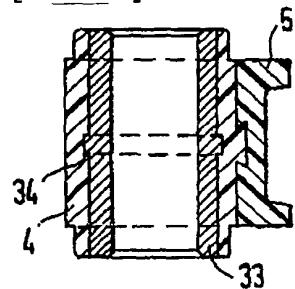
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DRAWINGS

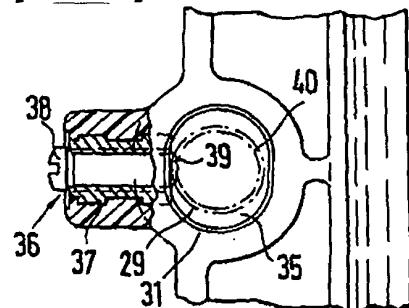
[A view 2]



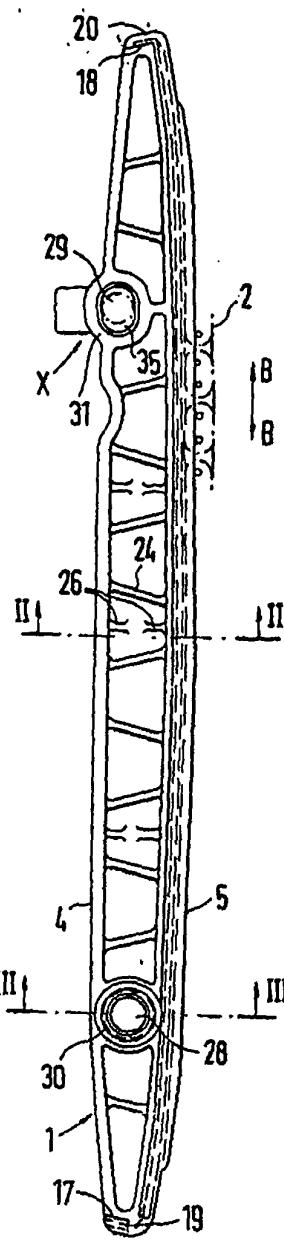
[A view 3]



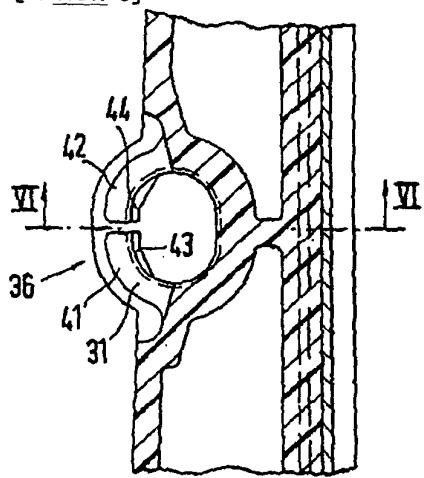
[A view 4]



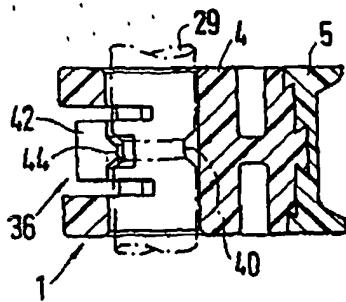
[A view 1]



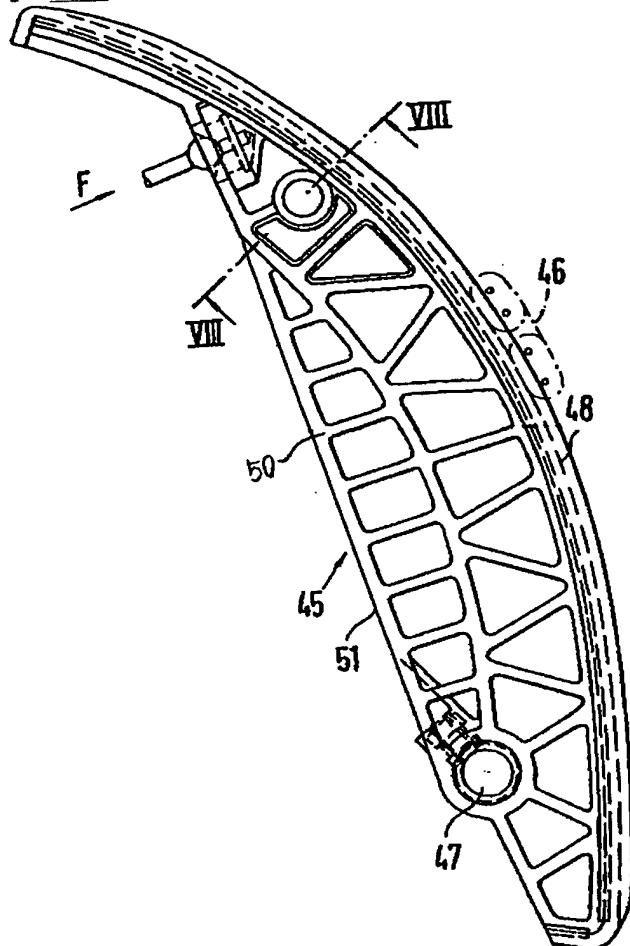
[A view 5]



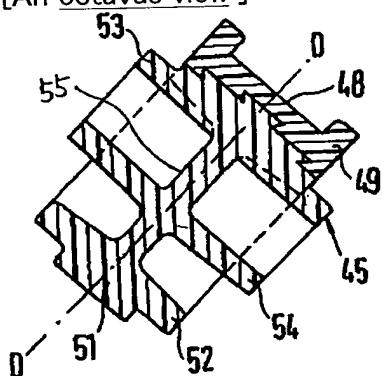
[A view 6]



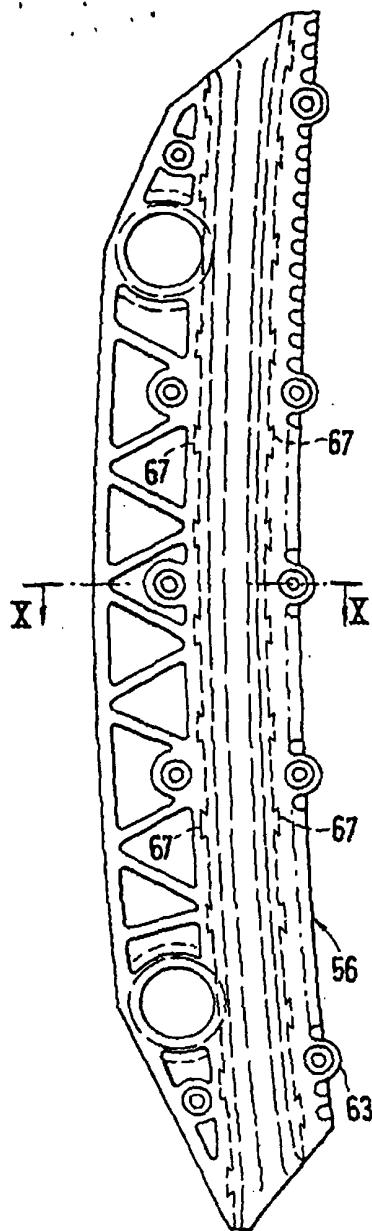
[A view 7]



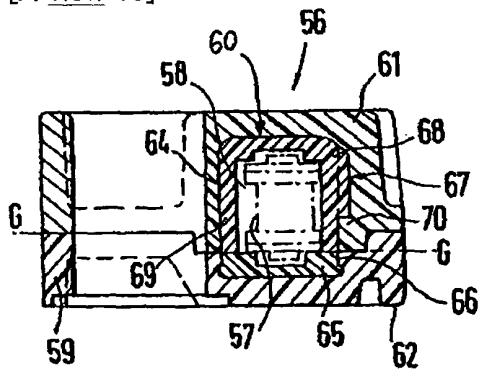
[An octavus view]



[A view 9]



[A view 10]



[Translation done.]

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最終頁に続く

(54)【発明の名称】 スライドレール

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(57)【特許請求の範囲】

【請求項1】内燃機関のカム軸駆動装置のためのチェーンを案内または緊張するスライドレールにおいて、支持体(4;50;59)とこの支持体に連結されたスライドライニング体(5;49;60)とを備え、支持体が高強度の合成樹脂からなり、スライドライニング体が耐摩耗性の合成樹脂からなり、支持体とスライドライニング体が、成形されたその一方を金型として用いて他方を射出成形することにより、互いに引っ掛けり合うように一体不可分に連結されていることを特徴とするスライドレール。

【請求項2】継手がありみぞ継手(9,10,67)であることを特徴とする、請求項1記載のスライドレール。

【請求項3】スライドライニング体(5,49)と支持体(4,50)の間に、チェーン走行方向(B-B)に延びる2個のありみぞ継手(9,10)が設けられていることを特

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徴とする、請求項1または請求項2記載のスライドレール。

【請求項4】支持体(4,50)がチェーン走行方向(B-B)に対して曲がった少なくとも一つの端領域(17または18)を備え、この端領域の周りをスライドライニング体(5)の湾曲部(19,20)が回っており、スライド体と端領域(17または18)の間にありみぞ継手(9,10)が設けかれていることを特徴とする、請求項2または請求項3記載のスライドレール。

10 【請求項5】支持体(4,50)が、横断面で見て、離隔された複数の横方向フランジ(21,22;52,53,54)を備え、この横方向フランジの間をウェブ(23,55)が延びていることを特徴とする、請求項1記載のスライドレール。

【請求項6】ウェブ(23,55)がスライドレール(1,4)の中心長手平面(D-D)内に設けられていること

を特徴とする、請求項5記載のスライドレール。

【請求項7】ウェブ(23,55)の側方に、横方向リブ(24,25)が設けられ、この横方向リブが横方向フランジ(21,22)の間で延びていることを特徴とする、請求項5または請求項6記載のスライドレール。

【請求項8】横方向フランジ(52,53)の間に他の横方向フランジ(54)が延設されていることを特徴とする、請求項5記載のスライドレール。

【請求項9】横方向フランジ(21,22)が節要素(26,27)によって局所的に、ウェブ(23)に対して支持されていることを特徴とする、請求項5、請求項6および請求項8のいずれか一つに記載のスライドレール。

【請求項10】チェーンを複数の側から取り囲む通路を含み、スライドライニング体(60)が支持体(59)内に埋設され、ありみぞ継手(67)が支持体(59)とスライドライニング体(60)の間でチェーン長手方向に対して横方向に延びていることを特徴とする、請求項1または請求項2記載のスライドレール。

【請求項11】ありみぞ継手(67)がスライドライニング体(60)と支持体(59)の対向する脚部(68,69)に設けられていることを特徴とする、請求項10記載のスライドレール。

【請求項12】ありみぞ継手(67)がスライドライニング体(60)の脚部(68,69)の一部だけにわたって延びていることを特徴とする、請求項10または請求項11記載のスライドレール。

【請求項13】支持体(4)に軸承アイ(30,31)が設けられ、この軸承アイが内燃機関の軸承ピン(29)の凹部(40)に係合する固定装置(36)を備えていることを特徴とする、請求項1から請求項12までのいずれか一つに記載のスライドレール。

【請求項14】各固定装置(36)がそれぞれの軸承ピン(29)の半径方向に弾性的に作用する弾性的な締めつけ要素(41,42)を含み、この締めつけ要素が支持体(4)と一体に作られていることを特徴とする、請求項13記載のスライドレール。

【請求項15】固定装置(36)がねじピン(38)であり、このねじピンが軸承ピン(29)に半径方向に作用し、ねじピンの球部分(39)が軸承ピンの凹部(40)に係合していることを特徴とする、請求項13記載のスライドレール。

【請求項16】スライドレール(1,42)の横断面で見て、第1のありみぞガイド(9)の引っ掛かり合う成形部(11,12)が中心長手平面(D-D)に隣接して延び、第2のありみぞ継手(10)の引っ掛かり合う成形部(13,14)が縁領域(15,16)に隣接して延びていることを特徴とする、請求項3記載のスライドレール。

【請求項17】スライドレール(1,45)の横断面で見て、ありみぞ継手(11,12および13,14)が互いに位置をずらして設けられていることを特徴とする請求項3記載

のスライドレール。

【請求項18】ありみぞ継手(67)がスライドレール(56)の全長にわたってほぼ均一に分配されて配置されていることを特徴とする、請求項10または請求項11記載のスライドレール。

【請求項19】支持体に連結されたスライドライニング体が耐摩耗性の合成樹脂によって作られ、支持体が高強度の合成樹脂で作られ、支持体とスライドライニング体が、互いに引っ掛かり合うように係合する1個または複数個の継手を介して互いに一体不可分に結合されている、チェーンを案内およびまたは緊張させるためのスライドレールを製作するための方法において、支持体(4)が先ず射出成形法で作られ、その後スライドライニング体(5)が、スライドレール(1)全体を形成するために、同様に射出成形法で支持体(4)と一体化されることを特徴とするスライドレールの製作方法。

【請求項20】支持体に連結されたスライドライニング体が耐摩耗性の合成樹脂によって作られ、支持体が高強度の合成樹脂で作られ、支持体とスライドライニング体が、互いに引っ掛かり合うように係合する1個または複数個の継手を介して互いに一体不可分に結合され、更に、チェーンを複数の側から取り囲む通路を含み、スライドライニング体が支持体内に埋設され、ありみぞ継手が支持体とスライドライニング体の間でチェーン長手方向に対して横方向に延びている、チェーンを案内およびまたは緊張させるためのスライドレールを製作するための方法において、スライドライニング体を形成するライニング体部分(64,65)が先ず射出成形法で作られ、その後同様に射出成形法で、支持体(59)を形成する部分と一体化されることを特徴とするスライドレールの製作方法。

#### 【発明の詳細な説明】

#### 【産業上の利用分野】

本発明は、支持体と、この支持体に連結された合成樹脂製のスライドライニング体とによって形成されている、特に内燃機関のカム軸駆動装置のための、チェーンを取り囲むスライドライニング体を形成するスライドレールに関する。

#### 【従来の技術】

40 佛国特許第1 408 575号公報には、横断面がT字形の合成樹脂製チェーンスライドレールが開示されている。西德国特許出願公開第30 49 106号公報から、チェーン伝動装置用テンションレールが知られている。このテンションレールは薄板で作られた支持体と、この支持体を取り囲む合成樹脂製のスライドライニング体とを含んでいる。支持体とスライドライニング体は互いに別々に作られた部品であり、係止装置を介して協働する。

西德国特許第34 17 100号公報は、チェーンを四方から取り囲む中空の通路付ケーシングを備えたスライドレールを示している。このスライドレールも合成樹脂から

なっている。

〔発明の課題〕

本発明の課題は、比較的に軽量で、大きな応力に耐え、そして低成本で製作することができる、チェーンを案内およびまたは緊張するためのスライドレールを提供することである。

〔課題を解決するための手段〕

この課題は本発明に従い、支持体とこの支持体に連結されたスライドライニング体とを備え、支持体が高強度の合成樹脂からなり、スライドライニング体が耐摩耗性の合成樹脂からなり、支持体とスライドライニング体が、成形されたその一方を金型として用いて他方を射出成形することにより、互いに引っ掛かり合うように一体不可分に連結されているによって解決される。本発明の他の特徴は請求項2乃至20に記載してある。

〔発明の効果〕

結合された支持体とスライドライニング体とからなる請求項1のスライドレールは、軽量であり、かつ簡単に製作可能である。更に、チェーンによって生じる負荷に対して永続的に耐えることができる。

請求項2記載のありみぞ継手は継手としてきわめて効果的である。

請求項3記載のごとく配置されたありみぞ継手は、支持体とスライドライニング体とを良好に結合する。

請求項4記載の湾曲部は支持体とスライドライニング体との結合を最適化する。

請求項5,6,7,8記載の特徴により、スライドレールは高強度の物体となる。

支持体とスライドライニング体からなる請求項10~12記載のスライドレールは、通路状のチェーン案内が必要とされる場所で使用可能である。

請求項13,14,15記載の特徴により、非常に効果的な固定装置が提供される。

請求項16,17,18記載のありみぞ継手により、スライドレールは大きな応力に耐えることができ、支持体とスライドライニング体はきわめて確実に結合される。

請求項19,20記載の方法は、スライドレールの適切で低成本の製作を可能にする。この場合、後加工が不要である。

〔実施例〕

図には、本発明の実施例が示してある。以下、この実施例について詳しく説明する。

第1図には、チェーン2を案内するためのスライドレール1が示してある。このチェーンは例えばチェーン伝動装置の無端部材である。チェーン伝動装置は図示していない内燃機関の部品であってもよく、この場合にはクラク軸と制御軸（カム軸ともいう）との間で作用する。

スライドレール1は支持体4とスライドライニング体5によって形成されている。このスライドライニング体

5に沿ってチェーン2が案内される。

支持体4とスライドライニング体5は異なる仕様の合成樹脂、特にポリアミドからなっている。この場合、支持体4にはガラス繊維を添加したポリアミドが使用され、スライドライニング体5にはガラス繊維を添加しない耐摩耗性のポリアミドが使用される。

スライドライニング体5はチェーン2のための滑り面6を有する。この滑り面は、U字状の輪郭を有するよう、肩7,8によって画成されている。

10 支持体4とスライドライニング体5は平面A-A内で組み立てられている。ユニットを形成するこの部品の間には、互いに嵌合しあつ相互に掛止する、すなわち互いに引っ掛かり合うように係合する機構が設けられている。この機構は、第2図に示す実施例では、2個のありみぞ継手9,10によって形成されている。このありみぞ継手はチェーン走行方向B-B（第1図参照）に延びている。

ありみぞ継手9,10は横断面で見て位置をずらして、すなわち互いに間隔Cにおいて設けられ、そして掛止する20 成形部11,12および13,14を備えている。ありみぞ継手の9の成形部11,12は、スライドレール1の中心長手平面D-Dの隣に設けられている。ありみぞ継手10の成形部13,14は、スライドレール1の縁領域15,16の隣に設けられている。

支持体4は、チェーン走行方向B-Bに対して曲がっている端領域17,18（第1図参照）を有する。スライドライニング体5の湾曲部19,20は前記端領域17,18の回りを回っている。この端領域17,18と湾曲部19,20の間にも、第2図に示したありみぞ継手が設けられている。

30 支持体4は横断面で見て（第2図）、間隔をおいて設けられた横方向フランジ21,22を備えている。この横方向フランジはウェブ23に連結され、このウェブはスライドレール1の中心長手平面D-Dに沿って延びている。この構造により、支持体4はダブルT字形となっている。

ウェブ23の側方には、互いに間隔をおいて設けられた複数の横方向リブ24,25が設けられている。この横方向リブは横方向フランジ21,22の間を延び、チェーン走行方向B-Bに対して垂直におよびまたは斜めに配置されている。更に、横方向フランジ21,22は節要素26,27によってウェブ23に対して支持可能である。この節要素は同様に、チェーン走行方向に対して横方向に延びている。

スライドレール1の保持は内燃機関の軸承ピン28,29で行われる。この軸承ピンは軸承アイ30,31を収容している。軸承アイ30には金属製のブッシュ33が挿入されている（第3図参照）。この金属ブッシュはつば34によって支持体4に保持されている。軸承アイ31は一種のスリット35を備えている。従って、スライドレール1の熱膨張、特に軸承ピン28,29の間の熱膨張が補償される。

スライドレール1と軸承ピン29の間には、固定装置36

が設けられている（第4図参照）。この固定装置は金属製のねじブッシュ37と、その中に装着されるねじピン38によって形成されている。ねじピンは球部分39が軸承ピン29の溝状の凹部40に係合し、それによってスライドレール1は軸方向に保持される。

第5図と第6図では、固定装置36が弾性的な締めつけ要素41,42によって形成されている。この締めつけ要素は支持体4と一体に作られている。締めつけ要素41,42はその突起43,44が軸承ピン29の凹部38に挿入されている。

スライドレール1は次のように製作される。先ず、支持体4が射出成形によって作られ、しかもそれに所属する、線E（第2図参照）に沿ったありみぞ成形部と共に作られる。その後、支持体4が基体として使用され、スライドライニング体5が射出成形によって前記の支持体4と一体化される。

第7図と第8図には、チェーン46を張るためのスライドレール45が示してある。そのため、スライドレールは47のところで揺動可能に支承され、そして図示していない、F方向に作用する装置によって張られている。スライドライニング体49のチェーン走行面48は弓形に延びている。これに対して、チェーン走行面48と反対側の支持体50の面51は、割線のように延びている。支持体50は隣接する横方向フランジ52,53の間に、他の横方向フランジ54を備えている。横方向フランジはすべて、中心長手平面D-Dに沿って延びるウェブ55に連結されている。本実施例では、横方向フランジ53,54は横断面で見て、スライドライニング体49よりも幅が広くなっている。これにより、スライドレール45の強度が一層高まる。スライドレール45のその他の点はスライドレール1の構造と同じである。

第9図と第10図では、スライドレール56は四方からチエーン57を取り囲む通路58を備えている。この場合、支持体59とスライドライニング体60は収容部分61と閉鎖部分62からなっている。この両部分は長手中心平面G-G\*

\*において組合せられ、63のところに設けられたボルトによって固定されている。この場合、収容部分61は三方からチェーン57を取り囲むU字形の第1のライニング体部分64を備え、閉鎖部分62は第2のライニング体部分65を備えている。この第2のライニング体部分は閉鎖部分62の中で肩66によって保持されている。

第1のライニング体部分64と収容部分61の間には、複数のありみぞ縦手67が設けられている（第9図参照）。このありみぞ縦手はスライドレール56の全長にわたってほぼ均一に分配されて配置され、そしてチェーン長手方向に対して横方向に延びている。その際、ありみぞ縦手67はライニング体部分64の両脚部68,69に形成されている。更に、ありみぞ縦手67は脚部68よりも短くなっている。すなわち、ありみぞ縦手67はライニング体部分64の一部にわたって延びている。従って、ライニング体部分はチェーン横方向において肩70によって固定保持されている。

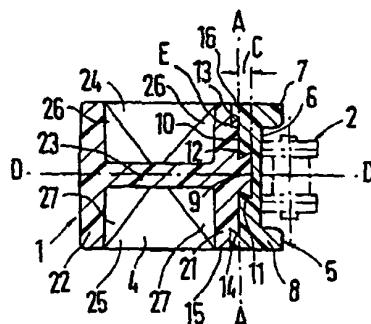
このスライドレールの場合には、先ずスライドライニング体60のライニング体部分64,65が別々のサイクルで射出成形により作られる。その後、支持体59の収容部分61と閉鎖部分62が射出成形によってライニング体部分64,65と一体化される。

#### 【図面の簡単な説明】

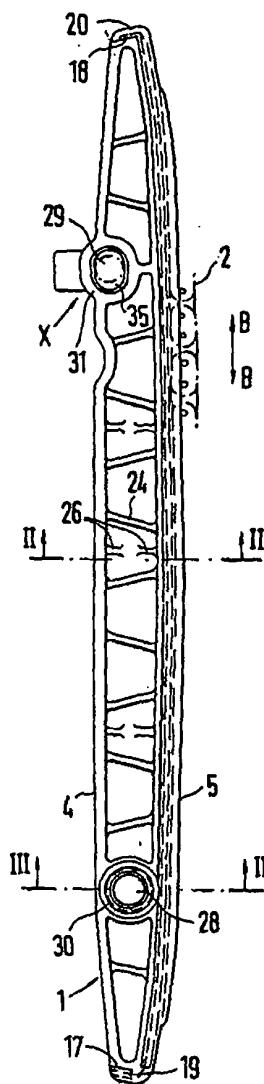
第1図はスライドレールの側面図、第2図は第1図のII-II線に沿った拡大断面図、第3図は第1図のIII-III線に沿った拡大断面図、第4図は第1図のX部分の拡大図、第5図は他の実施例の、第4図と同様な図、第6図は第5図のVI-VI線に沿った断面図、第7図は他の実施例の、第1図と同様な図、第8図は第7図のVII-VII線に沿った拡大断面図、第9図は他の実施例の、第1図と同様な図、第10図は第9図のX-X線に沿った拡大断面図である。

4,50,59,55……支持体、5,49,60……スライドライニング体、9,10,67……嵌合兼掛止機構、

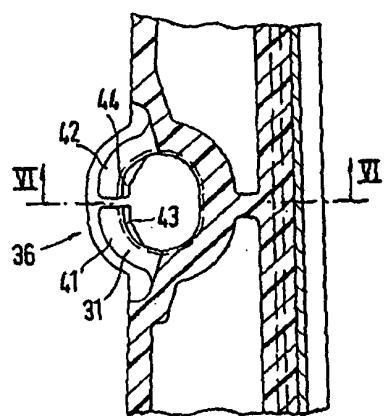
【第2図】



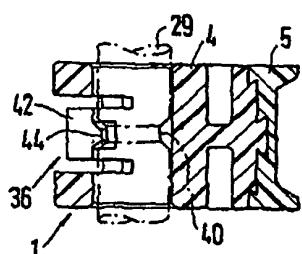
【第1図】



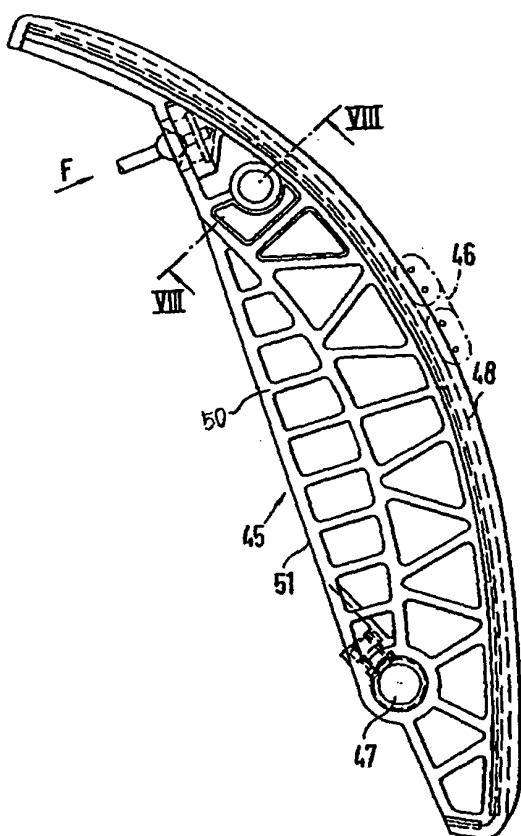
【第5図】



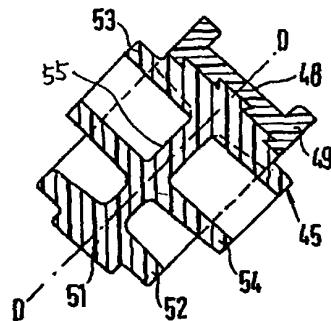
【第6図】



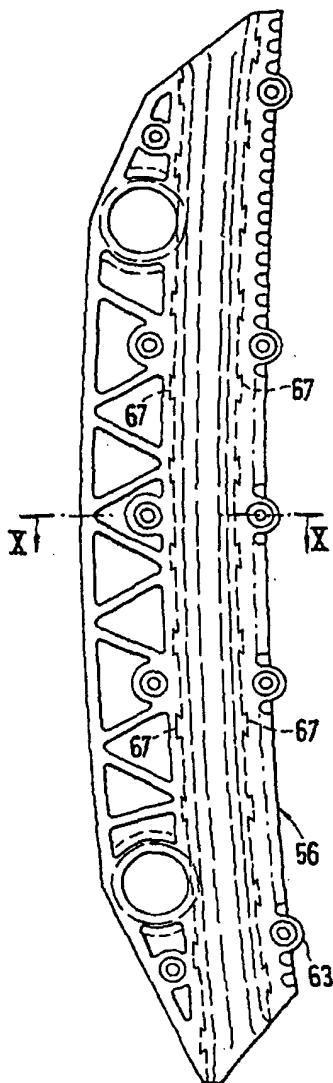
【第7図】



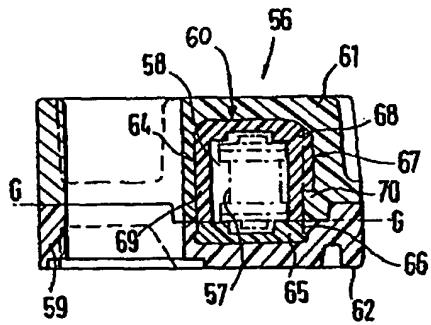
【第8図】



【第9図】



【第10図】



フロントページの続き

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(58)調査した分野(Int.Cl.®, DB名)

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